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THEODORE CALDWELL JANEWAY

THEODORE CALDWELL JANEWAY, physician, educator, and medical investigator, was born in New York on November 2, 1872, and died in Baltimore, at the age of forty-five, on December 27, 1917. He was the son of the late Dr. Edward Gamaliel Janeway and his wife Frances Strong Rogers Janeway.

Dr. Edward Gamaliel Janeway, a distinguished consulting internist in New York City, was a man of large experience in medical practise and in medical teaching. Though he published but little, his opinion was highly valued and commanded the respect and attention of the best medical workers in his city and in the country at large. An accurate clinical observer, he laid great stress upon the control of clinical studies in fatal cases by post-mortem examinations. Direct and simple in his methods he attained to unusual proficiency in clinical diagnosis, especially from the standpoint of pathological anatomy. He was rather taciturn, and was scrupulously honest with himself and with others. Like many men who are diffident by nature, he may have seemed outwardly austere when inwardly he was full of human sympathy and affection. Strongly objective in tendency and with relatively little interest in, or patience with, mere theory, he was unwilling to go beyond ascertainable facts, and preferred to confess ignorance rather than to assume a knowledge that he did not possess. His reputation grew with the years, and patients, especially those suffering from rare and puzzling diseases, from all parts of the United States were by their home physicians referred to him for ex-

amination. His example exerted a profound influence upon his son, not only in childhood and adolescence, but also during many years of close professional association in office practise.

Frances Strong Rogers Janeway was the daughter of a minister, and of a mother who was a woman of strong character, of rare spirit and of considerable artistic talent. From his mother, Theodore Janeway inherited charm of manner, a kindly tolerance, and a warm love for all mankind.

During his boyhood in New York City, and especially in the summer vacations, Theodore Janeway became acquainted with William K. Prentice, a boy a year older than himself, and the acquaintance grew into a friendship and intimacy that lasted throughout his life. Each regarded the other as his best friend, and in riper years the professor of Greek at Princeton and the professor of medicine at Johns Hopkins continued to prize highly this relationship.

After preparation at Cutler's School in New York, Theodore Janeway at the age of sixteen entered the Sheffield Scientific School at Yale, graduating in 1892 with the degree of Bachelor of Philosophy. Like many others who attended this school, he profited much from the influence of Chittenden, the professor of physiological chemistry, an influence that may be discernible later in his career in the interest he manifested in disorders of metabolism. As a youth, he is said to have been sensitive and high strung, interested in everything, impressing his companions with his alertness and the extraordinary activity of his mind. Though agile and fond of games, his rather delicate constitution limited his participation in college athletics. He early evinced an interest in public speaking. In the debating society to which he belonged as a boy, it was obvious that he possessed the gift of simple, lucid and powerful expression. This stood him in good stead when he became a teacher in the medical schools; in medical societies, and in campaigns for public betterment, too, his addresses were characterized by clearness, force, and refinement. He had a feeling for the proper use of words and an ability in combining them that one could wish were more common to men of science. His natural endowments, his early associations, and his college training all contributed to make his choice of a career in medicine a wise one.

Janeway entered upon his undergraduate medical studies at the College of Physicians and Surgeons of Columbia University, and obtained the degree of Doctor of Medicine in 1895. After graduating he served as interne at St. Luke's Hospital. In his medical studies, he exhibited unusual industry and enthusiasm, and from the beginning appreciated the significance of the scientific method in medicine and realized the importance of a broad training in the natural sciences and in the preclinical medical sciences as a foundation for the best type of clinical work.

Dr. Janeway's potential ability as a teacher could not long go unrecognized. In 1898, he was appointed to an instructorship in medical diagnosis in the reorganized New York University and Bellevue Hospital Medical College; later, he was given a lectureship there, continuing his work in this institution for some eight years. It was a time of transition from an older to a newer type of medical teaching and of hospital work in New York City and he and his father, experiencing the difficulties that are common to campaigns of reform, did their best to overcome the obstacles that impeded progress in the change of policy. It was during this

period that Dr. Janeway wrote his book entitled "The Clinical Study of Blood Pressure" and devised the special form of apparatus that bears his name for the determination of blood pressure in human beings. He strove while carrying on his other work to introduce important reforms in the out-patient department of the hospital. In his teaching, he discussed the symptoms and signs upon which diagnosis is based in the light of pathological physiology, took pains to discover the etiological factors, as far as possible, in each case that he studied, and emphasized the importance of tracing the pathogenesis of a disease-process. But conditions in the college did not improve as fast as he hoped they might, and he decided to resign his position rather than to continue in work that could only be unsatisfactory to him.

Despite the severance of his connection with the medical school in which he first taught, he was afforded ample opportunity for the continuation of clinical studies by the material at the City Hospital on Blackwell's Island where he was visiting physician, and by that of the large clientele at his father's office. His friend, Dr. Horst Oertel, the pathologist at the City Hospital, was a congenial co-worker, and students of the College of Physicians and Surgeons, in optional courses, profited much from the clinics and from the demonstrations of pathological material in this hospital. In 1907, through Dr. Janeway's influence, Mrs. Russell Sage endowed the Russell Sage Institute of Pathology with the object of promoting research work at the City Hospital, and Dr. Janeway himself acted as secretary and treasurer of the institute. Here much good work was accomplished, though four years after the foundation of the institute, Dr. Janeway was impelled to resign his position as visiting physician to the City Hospital because of his strong feeling that the commissioner of charities was not sympathetic with the scientific work conducted at the hospital in cooperation with the institute.

In 1907, Dr. Janeway was made associate in medicine at Columbia University, and two years later at the age of thirty-seven, he became Bard professor of medicine in the same institution. The duties of this important chair, together with his work at the Presbyterian Hospital where he now became visiting physician, taxed his strength to the utmost, for, in addition, he continued also to carry on a private practise. The burden steadily increased during the next five years and in 1914 he was forced by ill-health to interrupt his work in order to recuperate.

In this same year, 1914, the General Education Board had set apart a million and a half of dollars, known as the William H. Welch Endowment for Clinical Education and Research for use in the Johns Hopkins Medical School in Baltimore on the condition that three of the principal clinical chairs should be placed upon a so-called "whole-time" basis. The professors at the head of these three departments were to give their whole time and energies to the work of their departments, and were not to supplement their salaries by fees from private practise; if private patients were seen, the fees collected were to go to the treasury of the institution. The chair of medicine, which had been made famous by Professor William Osler's occupancy up to 1905 was included in the reorganization. Though the two men who had led the work in internal medicine in the school from 1905 to 1914 after Dr. Osler's removal to Oxford were sympathetic with the aims of the reorganization, neither of them was able, owing to the exigencies of external circumstances, to accept the professorship of medicine under the new conditions. The medical

faculty offered the "whole-time" chair to Dr. Janeway, and he, after careful consideration, accepted it. Though the relinquishment of private practise meant a large financial sacrifice to him, and removal to Baltimore entailed separation of himself and his family from the great city in which he had thus far spent his life with all its personal relationships and its special cultural opportunities, Dr. Janeway saw how great the opportunity was and rejoiced that he could avail himself of it. He found at the Johns Hopkins Hospital, of which he became the physician-in-chief, a medical clinic organized largely in accord with his ideals for the care of patients, for laboratory work, for teaching and for investigation, alongside of other clinics similarly developed, and associated with strong departments for the promotion of the preclinical sciences. Bringing with him Dr. H. O. Mosenthal, interested in metabolic studies, as associate professor, he retained, either on his "whole-time" staff or on an associated "part-time" staff, nearly all of the workers already in the department, and quickly made the readjustments necessitated by reorganization on the "whole-time" basis. In this congenial atmosphere, where his work could be carried on with a minimum of friction, he had every expectation of a long period of satisfactory hospital practise, of well-organized departmental teaching, and of leadership of a group of able young men in quiet scientific productivity. It was tragical that the period allotted to him proved to be so brief, but in his three years of service in Baltimore he made a deep impression, winning the respect and esteem of colleagues, of pupils, and of the community at large. The authorities of the medical school, though deeply regretting a loss that seems irreparable, may always congratulate themselves on the choice of their first "whole-time" professor of medicine, a man who combined large clinical experience with unusual teaching ability and with capacity for productive scientific study, and one who was content to give his whole time and energies to the work of the institution recompensed by an academic salary, by large opportunity for service, and by joy in the work—a pattern that the reform movement in medical education during the past three decades has been trying to construct.

At Johns Hopkins, Professor Janeway helped to plan a new building for the Hunterian Laboratory for Experimental Medicine, improved the facilities for metabolic studies, fostered researches in the heart station, and secured a substantial increase in the endowment for studies in tuberculosis known as the Kenneth Dow Fund. He was active in the Johns Hopkins Hospital Medical Society, was interested in the Historical Club, and acted as president of the Laennec Society for the Study of Tuberculosis.

Dr. Janeway was a member of the Medical Reserve Corps of the U. S. Army, and was the internist of the unit organized by the Johns Hopkins staff for work in France, now Base Hospital No. 18. When this unit was ordered abroad, he prepared to go with it, but at the last moment his place was taken by Dr. T. R. Boggs, Surgeon-General Gorgas having decided that Dr. Janeway's experience and powers could be used to greater advantage in his own office in Washington. As assistant to the Surgeon-General, Major Janeway went on active duty on June 30, 1917, and with the help of his successor at Columbia, Major Warfield T. Longcope, who acted as his chief assistant, undertook a very important task for the army, namely, the organization of that part of the medical work that had to do with diseases of the heart and

vessels. He first prepared a comprehensive and valuable circular defining the proper methods of examination of the cardiovascular system, the requirements for unconditional acceptance and the disqualifications for active service. He then organized groups of specialists, who, in conjunction with the members of the Tuberculosis Boards, made examinations of the cardiovascular system of the entire National Guard, and acted as consultants with the examiners of the drafted men in the hospitals at the cantonments. The examinations thus made have resulted in the rejection of thousands of men who were totally unfit for active service, but who would otherwise have been accepted, and in the acceptance of many normal men who would otherwise have been rejected. Major Janeway next selected from all parts of the country internists whom he recommended for the chiefs of the medical services of the cantonment hospitals. After this, he instituted, under the direction of Major Seale Harris, a circularization of the internists of the entire country with the object of obtaining suitable men for places of responsibility, and younger men for certain special services. At the time of his death, he was engaged in organizing three mobile medical units, one in the east, one in the center of the country, and one in the west; these units were intended to move from one hospital to another, assisting on the medical services in times of emergency. He had outlined plans, too, for a special hospital for the care and treatment of cardiac diseases and for investigations of military importance to be used with the United States troops abroad. This sketch of Dr. Janeway's work for the army, based upon a memorandum prepared at the Surgeon-General's office, may be supplemented by a word of personal appreciation from the Surgeon-General himself, who says: "Dr. Janeway was an unusually good executive and his loss to our office and his country was very great. I shall find it very difficult to replace him. I came to know him quite well personally, on our inspection trips, and I was very much attracted by his personality; he was one of the best all-round men that I ever met." The record of his six months, service in the Surgeon-General's office gives some idea of the speed and tension of his work. During the autumn months, in addition to this work, he kept in touch with his department in the medical school and still held some of his clinics. It is to be feared that overwork lessened his resistance to infection. He contracted pneumonia, developed a pneumococcus septicemia and died after an illness of six days. We must think of him, therefore, as one of those who sacrificed their lives for their country in the great war.

Dr. Janeway's clarity of mind, his depth and range of vision, and his sanity of judgment made him a wise counsellor, not only of patients but also of institutions. This was very evident by the respect shown for his opinion by the faculties of the schools in which he taught, by the councils of medical organizations like the Association of American Physicians and the American Society for the Advancement of Clinical Investigation, by the Surgeon-General of the army and his associates, and by the boards of directors of scientific institutions of which he was a member. Of the latter, especial mention should be made of the board of scientific directors of the Rockefeller Institute for Medical Research. To this board he was elected in 1911 as successor to the late Dr. Christian Herter. These two men were the representatives of scientific internal medicine in the board and the service they rendered in shaping the ideals and in planning the

activities of this great institute of medical research were very important. Janeway's idealistic temperament, his firm belief in the method of science as applied to the problems of clinical medicine, his wide knowledge of theory and thorough technical training, his large experience in actual practise, and, above all, his well-developed critical faculty, made him a most helpful and sound adviser in the field that he represented in this board, and in the other advisory boards to which he belonged.

Professor Janeway's original inquiries were related especially to diseases of the circulatory apparatus and to disturbances of metabolism. His researches upon blood-pressure and upon renal function will be especially remembered. Besides his monograph on "The Clinical Study of Blood-Pressure" (1904), he contributed to the medical journals some twenty important articles upon the subjects in which he was interested. Several of these appeared in the *Archives of Internal Medicine*, of the editorial staff of which he was a member. During the last years of his life, he was engaged in writing a treatise on "Diseases of the Heart and Blood-Vessels." He had prepared a complete syllabus of the volume and all internists must regret that the production of the monograph has been prevented by his untimely death.

Besides the recognition that had come to him in the form of academic appointments and the other posts of responsibility that have been mentioned, two honorary degrees had already been confered upon him, that of Master of Arts at Yale (1912) and that of Doctor of Science at Washington University, St. Louis (1915). Had he lived, there can be no doubt that he would have received many other honorary degrees. Very few men of worth are insensible to the acknowledgment of that worth by those whose judgment they know to be valuble; it is well that they should not be. Dr. Janeway's character and ideals were such that he cared little for other support:

> La gloire
> Ne compte pas toujours les voix;
> Elle les pèse quelquefois.

The support of those who have the good of internal medicine most at heart in this country Dr. Janeway undoubtedly had. But this was not indispensable to him as motive, his desire to further the science of medicine for the good of suffering mankind was to him an impelling force that was all-sufficing.

In his family life Dr. Janeway was particularly fortunate. Married in 1898 to Eleanor C. Alderson of Overbrook, Pa., he found in his wife a companion who shared his ideals, who supported him through difficulties, and who was prepared to make whatever sacrifices were necessary to permit the full employment of his energies to the attainment of any good that he deemed worthy of his effort. She and their five children, his mother, and two sisters survive him. To his home, his older friends and his students, of whom he also made friends, were cordially welcomed. He had a true and delicate ear for music and though he had no extensive musical training found pleasure and recreation in playing the violin in the family circle. Those who knew him best were charmed by his deep and ready sympathy, his quick and thorough understanding of others, and his unselfishness and generosity. His life will be an outstanding example to influence young men entering upon a career in medicine. His death, at a time when, in the ordinary course of events, he might well have been expected to give at least twenty years more of the highest kind of service to his country and to science, is one of those losses that mankind laments,

finds difficult to understand and to bear, and must some time learn how to prevent.

LEWELLYS F. BARKER

THE NEED FOR ORGANIZATION OF AMERICAN BOTANISTS FOR MORE EFFECTIVE PROSECUTION OF WAR WORK[1]

OUR country is now passing through one of the most critical periods in its history and the manner in which we shall emerge from this turmoil will depend on how successfully we can apply a lesson now being taught us by our arch-enemy Germany—the value of organized effort. The central empires are surpassed by the allies in manpower and in economic resources of every kind. But Germany is a marvel of organization and she has so thoroughly coordinated all her activities, especially those relating to war, that she is able to throw every ounce of her power in any direction desired. On this account she absolutely dominates her allies, and to this she owes her military efficiency and her powers of endurance. The United States and the entente nations are rapidly learning this lesson and, although the daily press is filled with stories of inaction and of clashing authority and with reports of investigations of alleged incompetency, still we see everywhere about us the evidences of greater cooperation, of standardization in production and of more thorough organization of all our activities—signs which augur well for future victory, for it is only by beating Germany at her own game that we can hope to win this war quickly.

The increase of efficiency by organization is no new discovery of the Germans or of this time of war. The remarkable development of American industry has been due in a large measure to the capacity of our business men for organization. But Americans are independent beings and have feared the evils of excessive organization—the curbing of personal freedom and initiative, and the reduction of the individual to the level of a cog in a smoothly running machine. The evils arising from over-organization are probably more to be deplored than those due to under-organization. Neither extreme develops the highest type of human being nor makes for lasting human progress. But in these times of stress we must not hesitate—the necessity for more thorough organization in all lines is forced upon us, and botanists, together with other scientists, must heed the call. This is a scientific war and science, not brute-force, must win it. Scientific workers become individualistic, and pure research naturally shuns the publicity of organization, but many lines of research and applied science in general are as much benefited by cooperation as is any industry.

Nowhere is the need for organization greater than in connection with the food supply, the importance of whose problems has been pressed upon our attention by the prevailing high prices and by the shortage of sugar and other important food stuffs. The relation of botanists to food production is a vital one and as botanists we now carry a grave responsibility.

We also face a wonderful opportunity. In the past botany has failed to receive the full measure of popular appreciation it deserves, though no subject is more vitally connected with human welfare and human progress than the study of plants. Botany is one of the oldest of human studies, yet we have seen other sciences of smaller ac-

[1] Invitation paper before Section G of the American Association for the Advancement of Science, in joint session with the Botanical Society of America and the American Phytopathological Society in a symposium on War Problems in Botany, Pittsburgh, December 29, 1917.

tual value to mankind overtake and pass it in public esteem and in public support. Does not the fault lie with botanists themselves? Have they not been too prone to lose themselves in their scientific studies and to forget or to neglect their human responsibilities? Botanists have allowed subjects like bacteriology, agronomy and horticulture to struggle up largely unaided and to win independent status so that to-day many specialists in these fields of botanical work do not recognize themselves as botanists and yield no allegiance to the mother science. It is not so with chemistry. Every worker in the chemical field calls himself a chemist, no matter what his special line may be, and chemistry is written large in public esteem as a great and broad and practical science. On the other hand the average person has little conception of what botany really is, and of its practical value to mankind. We can not expect the federal and state governments to fully recognize the great value of botanists to the nation when botanists themselves are at a loss to know how they may best serve in this time of crisis, and when they have allowed almost a year of war to pass without taking a prominent professional part in war activities.

This period of national danger presents to botanists an unrivaled opportunity to win the full recognition our science now lacks, to win it for all time, and also to serve the nation and help win the war, by showing what botanical research and the application of botanical knowledge can do in solving the problems of increased food production. This is our special field and the problems presented to us are so varied that all divisions of botany must take part in the work.

Time is pressing and the emergency demands that we speed up in our output of accomplishment in lines of immediate value in the war. This means mobilization of our botanical forces so that all workers capable of rendering assistance may be utilized; it means organization under wise leadership that our efforts may be properly correlated and thus rendered most effective; it means concentration on the problems most immediately important and if necessary the laying aside for the moment of the particular lines of research which now chance to interest us, if by so doing we can serve our country more effectively. At this time when we are facing a serious depletion of our ranks due to the call of many of the younger botanists to military service, how essential it is that those of us who are left should see to it that botanical work is not disrupted, that personal and professional interests are laid aside if need be, and that our efforts are wisely coordinated and properly distributed. As an example of the type of cooperative service I believe we should undertake, I shall discuss this afternoon one phase of botanical work now being organized, which aims to assist in increasing the food production of the United States and which is marked by organized cooperation on a large scale.

Two imperative demands have been made on the American people this year in connection with the food supply. The first of these is—*raise more food, increase food production.* Dwellers in towns and cities were bidden to enlarge their gardens, and we have responded by spading up our back yards and by plowing vacant lots. There has been much poorly directed effort like that of the patriotic citizen of New Jersey who, after watching his neighbor use a crow bar to make holes for his bean poles, went home and made similar holes into which he dropped his beans and buried them for all time; yet altogether the back-yard gardens have materially increased our supply of vegetables. Farmers were

bidden to increase their acreage, and have done this, so far as they were able. But it is clear that if the food supply is to be increased it must be accomplished largely by increasing the yield per acre, rather than by increasing the acreage; and the botanists of America must largely assume this responsibility. The adaptation of crops to soils and to climate, proper crop rotation and general improvement of cultural methods, the development and introduction of better seed and of improved varieties, the checking of ravages of plant diseases—these and many others are botanical problems in the solution of which botanists of every type must have a share.

The second demand on the people this year in connection with the food supply is —*save food, prevent waste.* We find here the problems of the pantry and the kitchen, of storage and transportation, of the preservation of perishable crops and foods—problems many of which are botanical or have botanical aspects.

There are no richer fields of scientific research to-day than the varied economic problems now presented to the botanists of America, and none fraught with greater possibilities of honor to the worker and of benefit to the nation, and to no class of botanists is the call stronger or the duty greater than to the plant pathologist. By preventing the ravages of diseases on growing crops he increases food production, and by checking the development of the organisms of decay on food material in transit and in storage he prevents food wastage. We are now saving food to feed our allies by instituting wheatless days and meatless days, and days and meals less this and that. Under present conditions this procedure is necessary and the curbing of our appetites has its hygienic value. But how much more pleasant it is to save food by curbing plant diseases, which can and should be done much more extensively than is now the case.

I shall not attempt to demonstrate the importance of the work before pathologists by citing figures giving estimates of losses due to plant diseases. I will only remind you that there is no economic plant which has not its fungous enemies, each of which takes its toll of the growing crop, while many plants count these enemies by the dozen or the score, so that the total aggregate loss is staggering. But the consumer does not appreciate this fact, and even the grower himself is indifferent. Both are so accustomed to a certain amount of loss from disease and storage rot that they accept it as a matter of course, not realizing that much of the loss is easily preventable. Since the symptoms of disease in plants are ordinarily much less striking than those of disease in animals, or even than the ravages of the crops by insects, the average farmer may not recognize the presence of disease in his grain field until the loss amounts to 15 or 20 per cent.; less than that is overlooked or charged to the weather. It may require the loss of a third to half his crop to arouse him to action and to the adoption of proper control measures.

So we see that the plant pathologist has a double duty to perform. He must first devise means for controlling plant diseases; he must then carry these control measures to the farmers and arouse sufficient public interest to secure their regular and effective adoption. The second of these functions is no less important than the first, and frequently is much more difficult of accomplishment. The scientific aspects of the problem may be solved when the pathologists have devised effective means of control, but the economic aspects are not solved until the disease in question is conquered and the losses reduced to a negligible amount by the general adoption of control measures by the growers.

Plant pathology has had a magnificent development during the last 20 years, and yet only a beginning has been made. As yet there are few if any plant diseases which we can say have been conquered and practically eliminated from consideration as the cause of any considerable economic losses. There is no record that any plant disease, after having once thoroughly established itself over a considerable territory, has ever been eradicated. Nor is there any plant disease which is to-day being effectively controlled in practise except in limited areas, no matter how simple or how effective the control measures are. Remedial measures are known for many diseases, and there are many whose complete control is easily possible, but the public has never been aroused to the necessity of thorough and persistent application of the remedies. Pathologists have not completed their work. We need more propaganda to instruct and to arouse sentiment in favor of disease control. We need public control of plant sanitation, as we have a public health service for human beings. We need laws requiring treatment of grain for smut as we now have laws requiring smallpox vaccination. At this time when the world is hungry, the producer of food has no more right to jeopardize or to neglect the health of his crop than you or I to endanger the public health. And the plant pathologist, as the guardian of the health of food crops, should rank in importance with the medical practitioner and the public health officer. We have come to the time when plant pathology should be carefully reorganized as a public service and when pathologists should scrutinize all phases of their work and see to it that no important part is neglected. The need for this action has been increased by the world war but it would have become necessary soon had the world remained at peace.

In glancing over the history of plant pathology we see that the first phase of the subject to develop was research work on the diseases—study of the life histories of the causal organisms, and of their relations to and effects upon the host plants. Perhaps control measures were also worked out, but with the publication of his paper the investigator dropped the subject without making sure that the results of his investigation were carried to the grower. Much valuable work of this character has been severely criticized as being impractical, some critics even now going so far as to urge that research work be suspended entirely for a time and attention concentrated on the practical application of present knowledge.

More recently there has developed a second phase of phytopathological work, *i. e.*, extension work or the actual carrying of the results of investigation to the farmer, and the practical demonstration to him of control methods, thus bridging the gap between investigator and grower. Great progress has already been made in this field and plans are now maturing for still further development. This is a line of work of the greatest importance, which should be specially pushed at this time in order that the ravages of disease may be effectively checked in those cases where adequate control measures are already known.

There remains a third phase of pathological work, which we may call the intelligence service, which is fundamental in importance and is contributory to the success of both research and extension work. A well-organized intelligence service is a necessary adjunct to every large enterprise. Armies have their scouts and spies, their raiding parties on land and aeroplanes in the air, to keep the commanders informed of the movements and plans of the enemy. Great business houses have their domestic

and foreign representatives and correspondents. Governments have their consuls, attaches and secret service. Human medicine has its public health service to guard the public health, to report on disease and to attend to sanitation. In the same way plant pathology needs its intelligence service, its public-health service for plants, which shall assist both research and extension pathologists in waging war on plant parasites.

The Plant Disease Survey of the Department of Agriculture is now organizing such a service, and I believe that it will prove to be of great value. By accumulating a large body of authoritative information on the geographical distribution and annual prevalence of plant diseases, together with careful estimates of the losses caused by them we shall assist in clarifying the disease situation in the various parts of the United States and in delimiting the problems involved. With these data at hand pathologists will be enabled to choose their research problems wisely and to concentrate their energies on those questions which are most pressing in their respective states. The Plant Disease Survey will also aid the research pathologist by furnishing him the information he needs during the progress of his studies, such as data on the nature and character of diseases in the field and on the relation of diseases to climatic and other environmental factors. We shall also assist the extension pathologist by informing him of the prevalence of diseases, of regions where losses occur and where demonstration work is most needed, of the varying effects of control measures in different regions, and of other matters of importance in planning and carrying on his campaigns of education and of disease control.

Up to this time the gathering of field data on plant disease has been left to the individual investigators who have gone into the field during the progress of their studies to collect the information they needed. They have thus been called away from the main features of their problems in order to collect data which should more properly be furnished them. Extensive collection of field data by an investigator beyond the time needed to keep him in touch with all phases of his problem, is time lost. He frequently realizes this and reduces his field work to a minimum, thus handicapping himself in his research work by an insufficient body of field data.

I shall not attempt at this time to discuss in detail the plans of the Plant Disease Survey. We purpose to organize this work on a broad basis, to coordinate all existing efforts along this line, to systematize the collecting of information and to make all data thus gathered immediately available to all to whom it may be of value. We have already associated with us as collaborators and local leaders the pathologists at almost all the state experiment stations, and we hope to extend this system of cooperation until we shall include in our organization all pathologists and all others able and willing to contribute reliable information on plant diseases. We also hope to develop and to maintain in the field a corps of trained observers who will supplement the reports of our correspondents and make detailed surveys in special regions and for important diseases. Much work must be done before our plans are fully developed. This will require time, general assistance on the part of botanists, and larger funds than are yet available.

Let me emphasize the fact that the Plant Disease Survey is distinctly a cooperative project. It is not an end in itself but aims to serve all pathological workers of the country by freely supplying all available data which can aid them in their work.

The success of this movement will depend on the extent to which pathologists cooperate in contributing to the common store of information. No matter how absorbing your present work may be each one of you as a botanist can aid us by reporting on the disease situation in your immediate neighborhood. This report may be made to our collaborator, the pathologist at your state experiment station or if preferred it may be sent direct to the central office of the survey at Washington. We shall be glad to discuss with you individually the best means of making your cooperation effective. Not only will the information you send us be of value, but your active support will assist us in our efforts to unite all pathological workers in one great cooperative service which will strive to do for our food crops some of the things which the public-health service does for us as human beings.

In this paper I have endeavored to point out the grave responsibility which rests on us as botanists during this world war. This responsibility is a challenge to us as patriotic Americans because we possess special knowledge and training which the nation needs, and to which she has a right during her hour of peril. I have emphasized the growing need for cooperation as with added responsibilities and reduced numbers we strive to meet the increasing demands of the immediate future. I have presented to you as an example of such cooperative effort the work of the Plant Disease Survey and have urged you to join us in our plans for strengthening phytopathological work. In closing let me outline two movements of fundamental importance which I believe botanists should immediately undertake.

First, let us arouse the public to an appreciation of the important part which botany must play in the agriculture of the future. Increased acreage and improved facilities for distribution of farm products are not sufficient to ensure the world an adequate food supply. Increased production must be the result of scientific research, and the average farmer must be taught the value of the prompt application of the results of research to the improvement of agricultural methods. And not only must the farmer be educated but propaganda must be carried on with the business man and the legislator that the botanist may be properly appreciated and his work supported. Botanical work, even of the most fundamental importance, is apt to lack those striking or sensational qualities which chain public attention, and unaided draw large appropriations from our lawmakers. Let us then teach our students the human significance of the study of plants, and send them forth as missionaries. Let us by spoken and printed word and by demonstration strive to instill into the public mind a greater respect for botanical research and a more ready acceptance of its results, thus doing our bit toward ensuring both scientific and material prosperity in the future.

And second, let us immediately organize to increase our efficiency. A serious crisis requires that maximum power be exerted to avoid catastrophe. Hence discipline and organization under aggressive leadership must replace independent uncorrelated effort. I propose therefore that the Botanical Society of America, the American Phytopathological and other botanical societies now in session at Pittsburgh appoint committees of experts in the various botanical fields to effect the necessary organization and to provide the leadership required. These committees shall consider the relative importance of the problems falling in their respective fields, whether or not those problems are now under investigation.

They shall mobilize the available botanical forces of the United States, especially those workers who are now engaged in war emergency work, and by careful distribution of the work and by correlation of effort seek the early solution of those problems which are of greatest immediate significance. The support which any movement receives and its effectiveness depends largely upon its leaders, hence these committees must be wisely selected and composed of aggressive men of action whose wisdom and personality will command the allegiance of their fellow botanists.

Many may doubt the wisdom of the plan I have suggested and feel skeptical of the results to be obtained through committees. I do not care what plan is adopted—the essential thing is action. No one can longer doubt the seriousness of the path which lies before this nation or question the imperative need for the greatest service botanists can render. American manhood is preparing to suffer and die upon the battlefields of Europe, and we who stay at home must not fall one inch short of the greatest accomplishment of which we are capable in providing the food and supplies our soldiers need. Any failure on our part means prolonging and intensifying the frightful agony. Have we thus far done our best as botanists? Are all botanists working with the single purpose of doing their full duty in this war? Does not unpreparedness still characterize us as a class? Have we not in general continued our pre-war activities, thinking the war would soon be over, or waiting for some mighty call to draft us into service? Let us wait no longer, but call *ourselves* to service. There is time to prepare for an effective campaign during 1918; there are many botanical questions of paramount national importance which should be solved this coming year; and there are many botanists who have assured me that they will gladly turn aside from their present work if they can serve more effectively elsewhere. Let us organize for more effective service that we may attract all available workers to our ranks and enlist every botanist in war emergency work. Let us develop a logical and comprehensive plan of campaign which shall supplement the plans of federal and state departments of agriculture and receive the united support of American botanists. Let us wisely correlate our efforts that we may increase our immediate accomplishment and make of American botanists a powerful army of trained scientists moving forward with power and precision in the service of the nation and the world.

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SCIENTIFIC EVENTS

ENGLISH VITAL STATISTICS

THE Registrar-General's return of vital statistics for 1916 in England and Wales, according to an abstract in the London *Times*, shows a reduction of 4.5 in the marriage rate as compared with that for 1915, when it was exceptionally high, and the lowest death-rate of children under one year ever recorded.

The report refers to the difficulties of framing estimates of population owing to the war. These have become so formidable that it is no longer possible to put forward figures otherwise than as rough approximations. As the estimates (except those for birthrate and marriage-rate purposes) are for the civil population only, enlistment has been treated as equivalent to emigration. The estimated civil population of England and Wales was 34,000,000 in 1916 (15,000,000 males and 19.000,000 females).

The marriages during 1916 numbered 279,846, a rate of 14.9 persons married per 1,000, 0.6 below the average rate of the decade 1901-10. The marriage rates for 1916 were 49.6 for males and 41.0 for females, the lowest hitherto

recorded for females, and the lowest but one for males.

We have thus (the report states) the curious phenomenon of an unprecedentedly high marriage rate in 1915 succeeded by an almost unprecedentedly low one in 1916. The flood of marriages which set in with the second quarter of 1915 did not ebb until a year later, so that considerably more marriages were registered in the first quarter of 1916 than in the corresponding quarter of any previous year. These violent changes are no doubt the direct consequence of the war, and appear in 1917 to be giving place to a less abnormal state of affairs.

There was in 1916 a notable increase in the proportion of marriages of young widows. The population of widows under thirty years of age must have been greatly increased as a result of the war. The marriage prospects of spinsters were decreased for two reasons—there were fewer marriageable males in consequence of the losses of unmarried combatants, and more marriageable females in consequence of the losses of married combatants.

In proportion to the total population, the birthrate was 20.9 per 1,000 living. The reduction of natality accompanying the war only amounted to 12 per cent., whereas in Germany the fall was reported to have been 40 per cent. in the two years 1915 and 1916.

The excess of births over deaths was 277,303. The number of fatal casualties incurred by English and Welsh troops during the year, says the report, must be very much lower than 277,303, and so the increase in population must have continued. The German statistics record 1,331,000 deaths in 1916, apparently exclusive of at least the great majority of fatal war casualties, as against 1,103,000 births; and the Hungarian figures are for deaths "not in action" 428,057, as against 333,551 births.

The deaths of 508,217 persons were registered, a rate of 13.3 per 1,000. The deaths of children under one year of age numbered 71,646, or 91 per 1,000, the lowest rate ever recorded. Eighty-eight reputed centenarians died, 70 of whom were women.

STANDARD TIME AT SEA

Following the action of the French navy the Lords of the Admiralty summoned a conference of representatives of the various government departments and scientific societies interested, to consider and report upon the desirability of establishing a standard time at sea in the British naval and merchant services. The report of this conference has now been presented to the Lords of the Admiralty, and the *Geographical Journal* publishes a summary of its recommendations. The conference had the advantage of the assistance of the French hydrographer, M. Renaud, accompanied by Lieutenant de Vaisseau Moreau, of the wireless staff of the French navy.

The principal business of the conference was to consider the desirability of extending to the sea the system of time zones now widely adopted on the land; a system whose advantages have long been recognized as highly conducive to precision and certainty in the interchange of telegrams, the arrangements of train and postal services, and in many other departments of life. Until recently a ship at sea was a law to itself; and although ship's time was usually more or less adjusted to apparent time at noon each day, there was no certainty that the time of a message despatched from the ship or of an entry in the ship's log could be translated into Greenwich mean time. The conference was of opinion that the establishment of zones at sea (outside territorial waters) corresponding to the time zones on land is the most practical method of obtaining uniformity in time reckoning at sea; and after examination of the "Planisphère des Fuseaux Horaires" prepared by M. Renaud (of which a copy has for some time been displayed in the Map Room of the Society) it recommended the adoption of the boundaries of the zones as defined therein and now in use in the French navy. It also expressed a hope that those countries which have not yet adopted the system of hour zones will in course of time conform to this system. The question of summer time was considered, and the conference was of the opinion that there was no advantage in introducing summer time on the high seas.

Only in this and in one other respect did the conference propose any change in the French system. The second change is one of nomenclature only, but it is of some importance. In the French system the time zones are numbered eastward from 0 to 23 hours, which, while in many respects convenient, has the disadvantage that it does not give without ambiguity the reduction from the time of any zone to the time and date of Greenwich. The conference therefore recommended that

> The zone extending from 7½ degrees east to 7½ degrees west of the meridian of Greenwich should be the Zero Zone. The zones west of the Zero Zone should be described as Plus 1, Plus 2 . . . up to Plus 12 for that part of Zone 12 lying east of the date line (*i. e.*, the line described in the Admirality Sailing Directions based on the 180th meridian, on crossing which from east to west the date must be advanced or put back one day respectively), and the zones east of the Zero Zone should be described as Minus 1, Minus 2 . . . up to Minus 12, for that part of Zone 12 lying west of the date line.

To ensure the application of the above scheme the conference considered it desirable

(*a*) That the alteration of the time of the clocks in ships should always be one hour, and be invariably recorded in the ship's log; but the instant at which the clock is altered need not necessarily be that at which the ship passes from one zone to another.

(*b*) That the zone description, *i. e.*, the correction required to obtain Greenwich time, be always plainly shown on the clocks, either by labels or otherwise.

(*c*) That in all entries in ship's records, whenever a date is given it should be accompanied by the zone description; and that in all official communications and correspondence, when a time is given the zone description should be added.

(*d*) That for all regular meteorological observations the ship's clock time should be used. That, as a rule, all self-recording meteorological instruments on board ship (which it would be difficult to adjust continually for zone time) should keep Greenwich time; the zone description should be entered daily on the record.

MEETING OF PETROLEUM GEOLOGISTS

AT a meeting of petroleum geologists held in Oklahoma City, Oklahoma, on February 15 and 16, the American Association of Petroleum Geologists was formed. The new organization was largely a change of name and widening of scope of activites of a highly successful local organization, the Southwestern Association of Petroleum Geologists, which has been in existence for three years. Over 100 geologists from various parts of the country were present. The widespread interest in petroleum geology and the large number of men now engaged in the profession was thought to warrant a national organization and the momentum gained by the local body assured the success of such a step.

Thos. M. O'Donnell, representing the Federal Fuel Administration, addressed the meeting and brought assurance from Washington that there need be no fear of hampering interference from his department as long as the oil men of the country did their patriotic duty and exerted their utmost efforts to maintain an adequate supply of oil to meet war demands.

An evening session was entertained with a talk by Professor James F. Kemp, on the geologic problems connected with the New York water supply, illustrated by stereopticon slides. The same session was addressed by Dr. I. C. White, who gave an interesting account of the huge gushers of Mexico. Dr. White's connection with the Doheny interests in Mexico gave weight and interest to his remarks on this subject through the courtesy of Mr. E. L. Doheny the moving pictures of the Huasteca Petroleum Company's wonderful well, Cerro Azul No. 4, were exhibited.

Professor R. D. Salisbury, of the University of Chicago, attended the meeting and was greeted by some twenty students of his department, who are now interested in the oil business of the southwest.

The list of papers presented at the several technical sessions included:

> The distribution of underground salt water and its relation to the accumulation of oil and gas, by Roswell H. Johnson, Pittsburgh, Pa.

The oil fields of Cuba, by E. L. De Golyer, New York, N. Y.

The relations of former shore lines to oil accumulation, by A. W. McCoy, Bartlesville, Oklahoma.

The bend formation as a source of oil in northwest Texas, by W. E. Wrather, Wichita Falls, Texas.

Contributions to the stratigraphy of the red beds, by D. W. O'Hern, Oklahoma City, Oklahoma.

Papers were read covering points of geologic interest brought out by the past year's development as follows: the Gulf Coast, by Alexander Deussen, Houston, Texas; Kansas, by R. L. Moore, Lawrence, Kansas; Kentucky, by J. W. Pemberton, Tulsa, Oklahoma; Northwest Louisiana, by Mowery Bates, Tulsa, Okla.

Officers elected for the current year were: *President,* Alexander Deussen, Houston, Texas; *Vice-president,* Dr. I. C. White, Morgantown, West Va.; *Secretary-Treasurer,* W. E. Wrather, Wichita Falls, Texas; and Editor, Charles H. Taylor, Oklahoma City, Oklahoma. The next meeting of the association will be held in Houston, Texas, the exact date to be announced later.

THE RESEARCH INFORMATION COMMITTEE

By joint action the Secretaries of War and Navy, with the approval of the Council of National Defense, have authorized and approved the organization, through the National Research Council, of a Research Information Committee in Washington with branch committees in Paris and London, which are intended to work in close cooperation with the officers of the Military and Naval Intelligence, and whose function shall be the securing, classifying and disseminating of scientific technical and industrial research information, especially relating to war problems, and the interchange of such information between the allies in Europe and the United States.

The Washington committee consists of

(*a*) A civilian member, representing the National Research Council; Dr. S. W. Stratton, chairman.

(*b*) The chief, Military Intelligence Section.

(*c*) The Director of Naval Intelligence.

The initial organization of the committee in London is

(*a*) The scientific attaché representing the Research Information Committee; Dr. H. A. Bumstead, attaché.

(*b*) The military attaché, or an officer deputed to act for him.

(*c*) The naval attaché, or an officer deputed to act for him.

The initial organization of the committee in Paris is

(*a*) The scientific attaché representing the Research Information Committee, Dr. W. F. Durand, attaché.

(*b*) The military attaché, or an officer deputed to act for him.

(*c*) The naval attaché, or an officer deputed to act for him.

The chief functions of the foreign committees thus organized are intended to be as follows:

(*a*) The development of contact with all important research laboratories or agencies, governmental or private; the compilation of problems and subjects under investigation; and the collection and compilation of the results attained.

(*b*) The classification, organization and preparation of such information for transmission to the Research Information Committee in Washington.

(*c*) The maintenance of continuous contact with the work of the officers of military and naval attachés in order that all duplication of work or crossing of effort may be avoided, with the consequent waste of time and energy and the confusion resulting from crossed or duplicated effort.

(*d*) To serve as an immediate auxiliary to the offices of the military and naval attachés in the collection, analysis and compilation of scientific, technical and industrial research information.

(*e*) To serve as an agency at the immediate service of the commander-in-chief of the military or naval forces in Europe for the collection and analysis of scientific and technical research information, and as an auxiliary to such direct military and naval agencies as may be in use for the purpose.

(*f*) To serve as centers of distribution to the

American Expeditionary Forces in France and to the American naval forces in European waters of scientific and technical research information, originating in the United States and transmitted through the Research Information Committee in Washington.

(*g*) To serve as centers of distribution to our allies in Europe of scientific, technical and industrial research information originating in the United States and transmitted through the Research Information Committee in Washington.

(*h*) The maintenance of the necessary contact between the offices in Paris and London in order that provision may be made for the direct and prompt interchange of important scientific and technical information.

(*i*) To aid research workers or collectors of scientific, technical and industrial information from the United States, when properly accredited from the Research Information Committee in Washington, in best achieving their several and particular purposes.

The headquarters of the Research Information Committee in Washington is in the offices of the National Research Council, 1023 Sixteenth Street; the branch committees are located at the American Embassies in London and Paris.

SCIENTIFIC NOTES AND NEWS

THE Geological Society of London has awarded to Dr. Charles D. Walcott, secretary of the Smithsonian Institution, its Wollaston Medal, in recognition of his contributions to Cambrian paleontology. The presentation of the medal was made at a meeting of the society in London on February 15, the secretary of the American Embassy receiving the medal in Dr. Walcott's behalf. The list of eighty-seven men of science who have received this medal since its establishment in 1831 contains the names of five other Americans, Louis Agassiz, James Hall, James D. Dana, Grove Karl Gilbert and W. B. Scott.

PROFESSOR A. N. TALBOT, of the University of Illinois, president of the American Society of Civil Engineers, is head of a board to advise on construction for the War Department, involving, it is said, the sum of over a billion dollars.

MAJOR FRED A. ALBEE has been placed in charge of the hospital to be situated at Islam, N. J. This hospital will consist of seven buildings with fifteen hundred beds and will be used for the restoration of crippled soldiers.

PROFESSOR D. M. FOLSOM, of the department of mineralogy of Stanford University, has been appointed fuel oil administrator for the western states. His jurisdiction will cover Idaho, Montana, Utah, Arizona, New Mexico, Nevada, Oregon, Washington, California and Alaska.

MAJOR SIMON FLEXNER, of the Rockefeller Institute, is conducting at Fort Sheridan, Ill., in conjunction with Major George Draper, an investigation in connection with the prevention of meningitis. Major Edward K. Dunham, of New York City, will visit Camp Lee, Petersburg, Va., for investigation in connection with the treatment of meningitis carriers.

PROFESSOR GEORGE F. SEVER, formerly professor of electrical engineering and acting dean of the faculty of applied science in Columbia University, has been commissioned a major in the Engineers' Officers Reserve Corps, and is now stationed in Washington. He has closed his engineering office in New York City.

CAPTAIN R. J. ANDERSON, of the Geneva Experiment Station, and Lieutenants W. A. Perlzweig, Henry R. Cates and Charles N. Frey, are making a nutritional survey of the army camps situated in the southern states. The survey is part of the work at present conducted by the Surgeon General's Office to determine the character of the food supplied to the American soldiers.

MAJOR J. F. CORBETT has been sent from the Rockefeller Institute to Canada to study the Canadian treatment of returning soldiers suffering from peripheral nerve injuries.

IT is announced that a medical board, consisting of Brigadier General Charles Richard and Major Frank Billings, has been appointed to revise the Manual of Instructions for Medical Advisory Boards working under the Selective Service Law.

Dr. Hermann M. Biggs has been elected a member of the international health board of the Rockefeller Foundation for Medical Research.

Professor G. H. Clevenger has resigned as research professor of metallurgy at Stanford University and is now engaged in directing cooperative experimental work in the U. S. Bureau of Mines, Netherlands East Indies government, Research Corporation of New York and others.

Dr. F. E. Carruth, formerly connected with the chemical division of the North Carolina Experiment Station, has become associated with the Schaefer Alkaloid Works, Maywood, N. J.

Professor Luigi Luciani, of the chair of physiology at the University of Rome, retires at the end of the present academic year, having reached the age limit. He has been a member of the senate and of the national board of public instruction.

UNIVERSITY AND EDUCATIONAL NEWS

Mrs. Russell Sage has given $100,000 to Syracuse University. The fund will be devoted to the direct interests of the John Slocum College of Agriculture, which is named after Mrs. Sage's father.

The new building of the University of Cincinnati College of Medicine was dedicated on February 25, the principal speakers being Major Christian R. Holmes, dean, and Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching. The new medical building was erected and equipped at a total cost of approximately $600,000.

According to the *Journal* of the American Medical Association, the Ontario legislature has granted to the Ontario University for 1918, the following amounts: Western, London, $20,000 for the public health department; $15,000 for the medical department; $15,000 for the arts, and a special grant of $10,000; Toronto University, large grants, including a special grant of $175,000; Queen's, Kingston, $80,000, including a special grant amounting to $25,000.

Lord Balfour of Burleigh, who presided at the recent annual meeting of the Carnegie Trust at Westminster stated that experts had reported favorably on the work accomplished during the past year, especially by research students, whose achievements had been of real use to the nation. Assistance to students, under payment of class fees for the past year, had been again reduced by £3,000 to £26,000, the beneficiaries numbering 2,112. Scottish university incomes from this source had in five years fallen to about half. This was a serious matter for the universities, and it was hoped that Treasury grants would alleviate the position. An encouraging feature of last year was the voluntary repayment of £1,308 by 21 beneficiaries.

Dr. William M. Jardin, since 1910 professor of agronomy, and later dean of the division of agriculture and director of the agricultural experiment station of the Kansas State Agricultural College, has been elected president of the College. Dr. J. T. Willard, professor of applied chemistry, becomes vice-president.

Dr. Harry Clark, who was from 1911 to 1917 an instructor in physics at Harvard University has been appointed professor of physics in Victoria College, Wellington, New Zealand.

The following have been appointed fellows of University College, London: Miss Harriette Chick, D.Sc., assistant to the director of the Lister Institute of Preventive Medicine; Dr. Ernest Marshall Cowell, M.D.., B.S., F.R.C.S., captain R.A.M.C.; Dr. Charles Authur Lovatt Evans, D.Sc., professor of physiology in the University of Leeds, major, R.A.M.C.; Dr. David Heron, D.Sc., secretary to the London Guarantee and Accident Company; Mr. William Howard Lister, D.S.O. captain R.A.M.C.; Mr. Edward Kenneth Martin, F.R.C.S. surgical registrar to University College Hospital, major R.A.M.C.; Mr. Edward Talbot, Paris B.Sc. The following were appointed fellows of King's College. Professor Arthur Dendy, D.Sc., F.R.S. professor of zoology in the Uni-

versity since 1911 (of zoology and animal biology at the College since 1905); Mr. Francis Lydall, 13th Wrangler; special lecturer on Advanced Electrical Engineering at the College, 1910–14.

DISCUSSION AND CORRESPONDENCE

THE AURORA BOREALIS

THE most extensive and brilliant aurora witnessed in central Illinois within the memory of living men attracted unusual attention on the evening of March 7, 1918, at Urbana, Illinois, in lat. 40° 6′ N., long. 88° 13′ W. Although the aurora is only rarely visible here at all, this one reached beyond the zenith.

The aurora first attracted my attention at 9:25 P.M., central time, in the form of a band of white light about 2° wide, extending in an arc from a point on the horizon at about N. 45° W. across the north sky, reaching a maximum altitude of about 20°, approximately due north, and descending at about N. 45° E. Through and beyond this, radiating white bands extending upward, and two rosy areas of about the color of the strontium flame appeared, one about N. 45° E. and 20° above the horizon, the other about N. 10° W. and 25° or 30° above the horizon.

The illuminated area extended rapidly, reaching a maximum at about 9:45 P.M., when it included the entire north half of the sky and overlapped into the south half from horizon to zenith. The main framework consisted of streamers of white light converging toward a point 30° or more south of and below the zenith. These streamers rose vertically from the north point of the horizon and its vicinity, but those rising from the east and west points of the horizon were inclined about 20° from the vertical (toward the south).

The streamers were fairly steady, in large part, extending, multiplying, and fading gradually; but in many parts of the sky there was a nearly continual play of light, in pulsations proceeding swiftly upward along the rays. Occasionally a streamer or a group of streamers brightened suddenly, giving an effect like that of the throwing on of a great searchlight.

Against the background of white streamers the red color expanded in glowing patches, increasing in brilliance as in area. During the maximum brilliance and extent of the aurora, the red was bright from the due east to the due west vertical circles and beyond them, and especially near the zenith (just below it to the north). It was never a continuous sheet of uniform brightness, but appeared brightest in roundish patches, locally streaking out parallel to the white streamers. The red lights pulsated and played up and down over the sky like the white.

About 9:50 P.M., after the aurora had faded slowly for a few minutes, the white streamers shortening to an altitude of 45° or less, the red light concentrated again in two patches, one about N. 45° E. and 20° above the horizon, the other N. 5°–10° W. and 25°–30° high. They varied from 3 to 10 degrees or more in diameter. About 9:55 a third bright red area appeared, about N. 40° W. and 20°–25° above the horizon. It was less perfectly circular than the other two, having a tendency to show brightest and to expand along lines parallel to the white streamers.

About 10:05 P.M. the N. 40° W. and N. 45° E. red areas faded out, leaving a single glowing patch N.–N. 10° W. and 20°–25° above the horizon, which continued to pulsate faintly and grow weaker. The white light had now subsided to a rather uniform sector of the north sky reaching from about N. 50° W. to about N. 50° E. and from the horizon to an arc whose maximum altitude lay in the site of the red patch in the north. At 10:45 P.M. there was still a glow in the north sky, apparent to an altitude of over 5°.

The angles here given were estimated, as I unfortunately had no instruments available at the time.

C. W. TOMLINSON
UNIVERSITY OF ILLINOIS

On the evening of Thursday, March 7, a remarkable auroral display was visible here. Some observers report a faint red glow in the eastern sky as early as seven o'clock, and it would appear from the testimony of several observers that the phenomena increased in brilliancy until about 9:45, at which time it

was particularly striking. From the extreme northwest a broad band of deep red, like a cloud reflection of a conflagration, spread upward to a point in the constellation Cancer, just south of the zenith, where it terminated within a horseshoe-shaped mass of white having the convex side toward the north. A similar but less brilliant red cloud extended from this point toward the east. Culminating at the same point within the horseshoe were greenish white streamers extending in all directions to the horizon. At this time also there was another red patch covering somewhat more than the area of the Great Bear in the northeast. Athwart this ran the zenith streamers from the north horizon.

At 10:45 the overhead display was fading and a broad red patch in the northwest covered Cassiopeia. This rapidly divided into two parts, drifting west and south.

By 10:30 the effect had practically disappeared except for a greenish glow toward the north.

Although the deep red color was massed in the streamers and patches mentioned, the entire sky was tinged with red, shading gradually outward from these dense masses.

C. M. Smith

Purdue University,
Lafayette, Indiana

SCIENTIFIC BOOKS

Catalogue of the Hemiptera of America North of Mexico, excepting the Alphididæ, Coccidæ and Aleurodidæ. By Edward P. Van Duzee. University of California Press 1917. Pp. i–xiv, 1–902.

The completion of this great paper marks another distinct advance in the study of North American insects. The large order Hemiptera has had comparatively few devotees, though select, as the names of Fieber, Stål, Reuter, Bergrot, Horváth, and Uhler will indicate, and until recently its study has been somewhat backward as regards quantity if not quality. During the last few years, however, a great many of the younger students of entomology have elected to become hemipterists, and in consequence there has been a sudden increase in scattered contributions with a general rise of interest in the order. The present is, therefore, a peculiarly fortunate time for the appearance of a full bibliographical catalogue which brings together in orderly and properly conservative form a report of what has so far been accomplished and furnishes an adequate basis for further advance. Hemipterists, if few in number, have been unusually prolific, as is attested by the more than 900 large pages of the volume under consideration.

Careful examination of the work reveals a well-planned and faithfully executed enterprise. The author exhibits a masterly grasp of his subject, as a whole and in detail, and his production merits the warmest praise in every respect. In the introduction Mr. Van Duzee gives a clear and convincing statement of the nomenclatorial principles which have guided him. These are his well known and by no means ultra-conservative views, grounded firmly on the International Code, eminently logical in theory and successful in practise. For the first time the principle of priority is applied and fully worked out in connection with the names of all taxonomic groups, with such happy results that to me the general adoption of this plan seems sure. Original spellings are retained, but the author expressly disclaims any intention of restraining those who refuse to assist in perpetuating philological and grammatical errors. In addition to these general matters, a number of special points deserve particular attention.

In recording the distribution of the species, the author has done well to abandon the method of his recent check list, simply giving under each species a list of the states in which it is known to occur. As he remarks in the introduction, "our knowledge of the distribution of our species is still too fragmentary to allow the satisfactory naming of a habitat,'"—a procedure too frequent in hemipterological writings. In this way the student is forcibly reminded of the extensive lacunæ existing in this branch of the study, and he can go about the business of filling them with some confidence. The scarcity of

Canadian records is particularly striking—and regrettable, in view of the apparent significance of holarctic migrations in the past. Omissions seem very few, considering the magnitude of the work. I note the absence of certain published records, *e. g., Sciocoris microphthalmus* (Palæarctic), *Zelus socius* (Me., Mass.), and a scarcity of Maine records before page 151.

It is an especial pleasure to report the extreme care which the author has evidently taken to avoid minor errors, clerical and typographical. This class of mistakes, though hardly susceptible of complete extermination, has been reduced to an attenuated minimum, contrasting most favorably with much past and contemporary work. *Dictyonota tricornis americana* page 815, occurs in Maine, not "Mo." *Lethiini* (properly *Lethœini*) on page 196, and *Systelloderus* (properly *Systelloderes*) on page 225, are lonesome examples of misspelling, I believe.

The typography calls for a special word of praise. The choice of types and the arrangement of the matter on the page are unexceptionable and aid the eye greatly in making quick reference, quite in contrast to the arrangement adopted in the author's check list.

The species are numbered in agreement with the check list, additions being indicated by fractions, a detail which will serve the convenience of collectors, though it conveys a wrong impression regarding the number of species comprised in the various groups. The author gives 3,198 as the number of North American species now included in the order (three families excepted), a net gain of 253 since the check list appeared in 1916. Of this total the Heteroptera number 1,629, the Homoptera 1,569.

A publication of this type must appeal to a far wider circle than that of the comparatively few specialists to whom it is of most immediate and intense interest, since every biologist has frequent occasion to ascertain the present taxonomic status or the known distribution of some form with which he may be concerned. Entomologists will at once perceive the value of Mr. Van Duzee's work—to others it may be recommended unreservedly as authoritative and reliable in the highest degree.

H. M. PARSHLEY

SMITH COLLEGE

SPECIAL ARTICLES

REPORTING MOISTURE RESULTS[1]

THE following quotations[2] is explantory of the soil physicists' use of the term percentage in connection with weight determinations of moisture.

> Suppose a certain soil in field condition weighs 100 pounds to the cubic foot and carries 10 pounds of water. Obviously it would contain 10 per cent. of water by the wet method of calculation, or 11.1 per cent. of water using the absolutely dry soil as the basis. . . . In ordinary calculations of water, . . . the percentage by dry weight is generally used because of its simplicity and the facility of expression that it affords.

Analyses are reported by chemists both on the wet and dry bases. The form in which an analysis is usually stated is as follows:

TABLE I

Soil Analysis

	Wet Basis, Per Cent.	Dry Basis, Per Cent.
Moisture	20.0	
Volatile matter	20.0	25.0
Ash other than silica.	10.0	12.5
Silica (SiO_2)	50.0	62.5
Total	100.0	100.0

It is noted that the per cent. of moisture contained is not included in the dry basis analysis.

To ascertain if the practise of stating the amount of water, present for every 100 parts of dry material, as "per cent. of moisture on the dry basis" leads to false interpretations the following data was given to several chemists and to three soil physicists:

[1] Contribution from Research Chemistry and Bacteriology Laboratories of department of horticulture, Purdue University Agricultural Experiment Station, Lafayette, Indiana.

[2] "Soils, their Properties and Management," 1915 edition, by Lyon, Fippin and Buckman.

TABLE II

Soil Analysis Calculated to Dry Basis

	Per Cent.
Volatile matter	25.0
Ash other than silica	12.5
Moisture in sample	20.0

Wanted the percentage composition of the soil as submitted to the analyst in percentages of moisture, silica, ash other than silica and volatile matter.

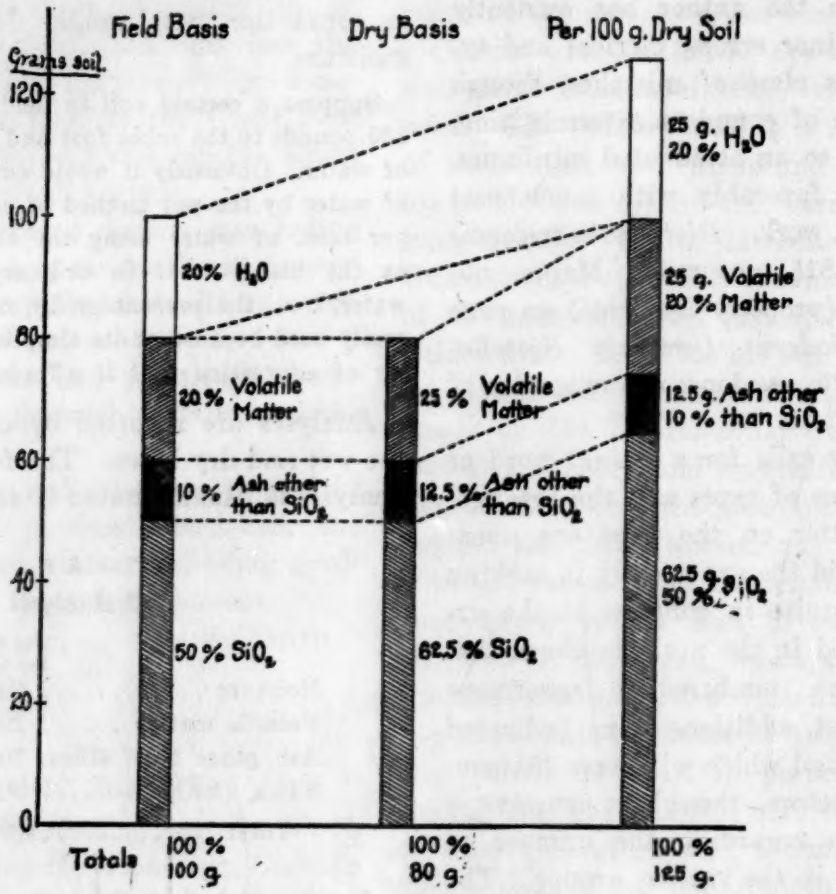

Fig. 1.

TABLE III

Interpretation of Soil Analysis

	Soil Physicists, Per Cent.	Chemists, Per Cent.
Moisture	16.0	20.0
Silica	52.5	50.0
Ash other than silica.	10.5	10.0
Volatile matter	21.0	20.0
Total	100.0	100.0

The above table is evidence that the practise of stating moisture as "per cent. on the dry basis" has caused the soil physicist to regard analyses to mean different percentages than the chemist, *who made them,* found in the analyses he made. Soil physicists are apparently not the only class who are denoting the moisture present in certain materials as "per cent. on the dry basis." Different individuals and laboratories have been observed when making moisture determinations to report, for example, 33.3 per cent. moisture when the material under analysis contained 25 gm. of moisture in every 100 gms. of material. Here the phrase, "per cent. of moisture on the dry basis" was not included, for they consider that analyses should be taken as on the dry basis, unless it is specified otherwise. The interpretation to be given incomplete analyses must be based on a knowledge of the reporter's method of calculating moisture. This often has to be learned through correspondence.

It is said that "usage dictates." In this connection there are different uses made of the word per cent. The analyst is not the one to

determine the basis on which soil physicists and certain others must compare soils. It is contended, however, that the soil physicist should not be allowed to express ratios as percentages unless the substances so reported are actually contained in the material in the condition reported upon. The analyst does not include the moisture in a dry basis analysis for the object of the dry basis analysis is to eliminate the moisture so that the constituents of the material may be readily compared in amounts with those in other materials.

Speaking of the per cent. of moisture in moist soil the following quotation is made:

> For example, 100 grams of wet soil containing 5 per cent. of water would consist of 5 grams of water and 95 grams of soil, a ratio of 1 to 19. If the soil contained instead 25 per cent. of water, the ratio would be 1–3 instead of 1–3.8 as the percentages would naturally lead one to expect.

In speaking of the particular objection referred to above the same authors write:

> In using a percentage of moisture based on the dry soil instead of on the wet, the first of the above objections is eliminated. Consequently this method of expression is perfectly legitimate as long as soils having about the same specific gravity are compared.

The above is taken to signify that the soil physicist has decided that the weight of water present with each 100 parts of dry soil gives him a better basis of comparing soils than he would have if he stated the same result in terms of percentage composition: example, that 100 grams of dry soil will take up 50 grams of water is a better basis of comparison for the soil physicist that the soil contains 33.3 per cent. of moisture when saturated.

If those, including in addition to soil physicists, chemists, botanists and general agriculturalists, who have been reporting moisture as "percentage on the dry basis" would substitute something for the WORDS per cent. or percentage in this connection all would interpret moisture results as they were intended to be interpreted.

The following phrases which serve the case equally well are suggested:

1. Ratio of water to 100 parts of dry soil.
2. Parts of water with 100 parts of dry soil, under conditions specified.
3. Moisture with 100 parts of dry soil.
4. Grams moisture per 100 grams of dry soil.

H. A. NOYES

PURDUE UNIVERSITY

THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

THE annual meeting of the Federation of American Societies for Experimental Biology, which includes The American Physiological Society, The American Society of Biological Chemists, The American Society for Pharmacology and Experimental Therapeutics and The American Society for Experimental Pathology, held its annual meeting at the University of Minnesota, December 27 and 28, and at The Mayo Foundation, Rochester, Minnesota, December 29. 1917. The meetings were very well attended and the scientific interest was unusually strong. Every one voted the sessions an unqualified success.

The meeting opened with a joint session of the societies on Thursday morning and closed with similar joint sessions at Rochester, Saturday morning and afternoon. Friday afternoon was given to joint demonstrations and the Saturday morning session opened with surgical and scientific laboratory demonstrations at Rochester. The physiologists held three special sessions, the biochemists and pharmacologists each two special sessions, and the pathologists one special session. Some 265 guests were present at the joint dinner provided for the federation, the anatomists and the zoologists given at the Hotel Radisson, Thursday evening, December 27. The local committee provided very convenient arrangements for the meetings in Millard Hall, University of Minnesota Medical School. The membership of the society is indebted to the local committee for the very pleasant smoker and buffet luncheon Friday evening.

A special train carried the visitors to the last day's session at Rochester. A very pleasant interval was the noon-day luncheon by the hospitality of Dr. and Mrs. William J. Mayo at their home in Rochester. The session closed with a dinner under the auspices of the Mayo Foundation staff at the Hotel Zumbro and a social and smoker which followed at the Mayo Clinic assembly hall.

The officers and members of the American Federation feel under special obligation to the local committees at Minneapolis and Rochester for the

carefully executed arrangements for the comfort and success of the entire series of meetings.

Chas. W. Greene,
General Secretary

THE THIRTEENTH ANNUAL MEETING OF THE AMERICAN PHYSIOLOGICAL SOCIETY

The thirtieth annual meeting of the American Physiological Society was held with the Federation of American Societies for Experimental Biology, at the University of Minnesota, December 27 and 28, and at The Mayo Foundation, December 29, 1917. The program of the physiologists was crowded from beginning to end, in fact this is the only criticism to be offered upon the success of the meeting. The time allotted did not allow adequate time for discussion. The scientific papers were of widely distributed interest, but special mention may be made of the series of investigations on the subject of surgical shock, and papers on the physiological, clinical and chemical studies and the identification of the active iodine-containing principle of the thyroid. Dr. Kendall reported the synthetic production of this substance.

The attendance of the meeting was good though not large, about twenty per cent. of the total membership. However the attendance was very representative of both the varied scientific interests of the society and of the extremes of territory. Some thirteen were present from the Atlantic coast, four from the Pacific slope. Canadian representatives were present from Toronto to Manitoba. On the whole the meeting was voted one of the most successful ever held by the society.

The following new members were elected: Walter C. Alvarez, M.D., instructor in research medicine, University of California Medical School, Hooper Foundation; A. M. Bleile, M.D., professor of physiology, Ohio State University; Montrose T. Burrows, associate professor of physiology, Washington University Medical School; E. B. Forbes, B.S., Ph.D., chief in nutrition, Ohio Experiment Station; Maurice H. Givens, Ph.D., fellow and assistant in physiological chemistry, Yale University; Alfred E. Livingston, associate in physiology, University of Illinois, College of Medicine; Fred T. Rogers, Ph.D., instructor in physiology, University of Chicago; R. W. Scott, A.B., M.D., associate in physiology, Western Reserve University Medical College; James R. Slonaker, B.S., Ph.D., assistant professor of physiology, Leland Stanford Jr. University; Frank W. Weymouth, A.B., Ph.D., assistant professor of physiology, Leland Stanford Jr. University.

The officers elected for the ensuing year were Frederic S. Lee, Columbia University, President; Charles W. Greene, University of Missouri, Secretary; Joseph Erlanger, Washington University, Treasurer, and J. J. R. Macleod, Western Reserve University, Councilor for the 1918–1921 term.

The program presented is given below:

SCIENTIFIC PROGRAM AT MINNEAPOLIS

Hunger, appetite and gastric juice secretion in man in prolonged fasting (15 days): A. J. Carlson, University of Chicago.

On so-called "fatigue-toxin": Frederic S. Lee and B. Aronowitch (by invitation), Columbia University.

Some phases of industrial fatigue: Frederic S. Lee (for the Committee on Industrial Fatigue).

The quantitative measure of general fatigue: A. H. Ryan, Tufts Medical College.

Strength tests in industry: E. G. Martin, Stanford University.

Nutritive factors in some animal tissues: Lafayette B. Mendel and Thomas B. Osborne, Yale University and Connecticut Experiment Station.

Experimental mammalian polyneuritis: Carl Voegtlin and G. G. Lake (by invitation), Hygienic Laboratory, Washington, D. C.

Further observation on the production of lactic acid following alkaline injections: J. J. R. Macleod, Western Reserve University.

The isolation and identification of the thyroid hormone: E. C. Kendall, The Mayo Foundation.

Some problems of nutrition of the army, the work of the food division of the Surgeon General's Office: John R. Murlin, U. S. Sanitary Corps, Washington, D. C.

The influence of music on cardiograms and blood pressure: Ida H. Hyde, University of Kansas.

A simple method for the resuscitation of the human heart: A. D. Hirschfelder, University of Minnesota.

Regulation of venous blood pressure: D. R. Hooker, Johns Hopkins Medical School.

Blood pressure in sharks and the shock problem: E. P. Lyon, University of Minnesota.

Observations in shock: C. C. Guthrie, University of Pittsburgh.

Shock and its control. (Paper from France presented by Dr. Lee.) W. B. Cannon.

Observations on the volume flow of blood of the submaxillary gland: Robert Gesell, Washington University.

The rôle of the central nervous system in shock: F. H. Pike, Columbia University.

Some reactions in the development of shock by diverse methods: J. ERLANGER, ROBT. GESELL, H. S. GASSER and B. L. ELLIOTT (by invitation), Washington University.

A method for the determination of blood volume: WALTER J. MEEK and HERBERT S. GASSER, University of Wisconsin.

The blood volume changes in shock and the modification of these by Acacia: H. S. GASSER, W. J. MEEK and J. ERLANGER.

A study in Acacia in view of its use in perfusion solutions: WALTER J. MEEK and HERBERT S. GASSER.

Diet experiments bearing on carbohydrate luxus consumption and wasteful eating: ADDISON GULICK, University of Missouri.

The physiological action of the thyroid hormone: E. C. KENDALL, The Mayo Foundation.

Effects of salts on the metabolism of nerves: L. K. RIGGS (by invitation), University of Chicago.

Test of methods of control of the clothes louse: WM. MOORE, University of Minnesota.

The tension of the respiratory gases in the afferent and the efferent blood of the lungs: ROY G. PEARCE, Lakeside Hospital, Cleveland.

Graphic records of reflexes and clonus: R. E. MORRIS (by invitation), and L. G. ROWNTREE, University of Minnesota.

The cerebral center of mastication: F. R. MILLER, Western Reserve University.

Relation of lesions of the optic thalamus to nystagmus, body temperature and spinal reflexes in the pigeon: FRED R. ROGERS (by invitation), University of Chicago.

Comparison of the rhythm of the respiratory center and trapped wave in Cassiopea: J. F. MCCLENDON, University of Minnesota.

Some points in the nervous regulation of respiration in the cat: C. C. GAULT (by invitation), University of Minnesota.

The effect of alteration of blood pressure on the blood of the rabbit: F. H. SCOTT, University of Minnesota.

Adrenalin vasodilator mechanisms in the cat at different ages: FRANK A. HARTMAN, University of Toronto.

Vasodilator nerves of the skin: H. RICHARDSON and O. WYATT (by invitation), University of Minnesota.

A note on the mechanism of heart muscle contraction: MONTROSE T. BURROWS (by invitation), Washington University.

Evidence of toxic action of the ovaries of the gar: CHAS. W. GREENE, ERWIN E. NELSON (by invitation), and EDGAR D. BASKETT, University of Missouri.

Some electrical phenomena of the submaxillary gland: ROBERT GESELL, Washington University.

Vagotonic and sympathetic-atonic effects on gastric motility: T. L. PATTERSON (by invitation), Queen's University.

A new factor in the control of the pylorus: ARNO B. LUCKHART, University of Chicago.

The rôle of catalase in shock: W. E. BURGE, University of Illinois.

Studies on gastric secretion and urine ammonia: A. C. IVY (by invitation), University of Chicago.

The effects of alkalies on gastric secretion: CHAS. E. KING, University of North Dakota.

The influence of water on gastric secretion: G. F. SUTHERLAND (by invitation), University of Chicago.

The cause of the chill and febrile reaction following transfusion of citrated blood: CECIL K. DRINKER and HAROLD H. BRITTINGHAM (by invitation), Harvard University.

Further evidence of the mechanism of the production of the sounds of Korotkoff: A. M. BLEILE (by invitation), and CLYDE BROOKS, University of Ohio.

Duration of the systole and diastole of the human heart: W. P. LOMBARD, University of Michigan.

JOINT DEMONSTRATIONS AT MINNEAPOLIS

A new diastolic criterion in oscillatory blood pressure registration in the human: BERNARD FANTUS (by invitation), Chicago.

The mechanical factors influencing the cerebrospinal fluid: H. C. BECHT, Northwestern University.

An automatic and bloodless method of recording the volume flow of blood: ROBERT GESELL.

Stimulation under increased intra-cranial pressure: A. S. LOEVENHART and MESSRS. MARTIN and MALONE (by invitation), University of Wisconsin.

On a uniformly satisfactory method of collecting urine separately from each ureter in acute experimental work on dogs: ARNO B. LUCKHARDT, University of Chicago.

Demonstration of the pre-anacrotic phenomenon and its relation to the arterial compression sounds of Korotkoff: JOSEPH ERLANGER, Washington University.

An apparatus for the determination of the tension of the alveolar gases in arterial and venous blood: ROY G. PEARCE and W. W. YORK (by invitation), Western Reserve Medical College.

Colorimeter and tubes for P_h of sea water: J. F. McClendon, University of Minnesota.

Electrometric titration of blood plasma: J. F. McClendon.

Some uses of wire in the laboratory: A. D. Hirschfelder, University of Minnesota.

Simple valves for respiration experiments: A. D. Hirschfelder and E. D. Brown.

A simple method of making stalagmometers: A. D. Hirschfelder.

An experiment for affording training in intravenous and intraspinal injections: A. D. Hirschfelder and E. D. Brown.

Demonstration of a new form of colorimeter: Joseph C. Bock and S. R. Benedict, Cornell Medical College.

Method of recording reflexes: R. E. Morris and C. E. Nixon, University of Minnesota. (By invitation.)

A simple pneumograph: E. D. Brown, University of Minnesota.

JOINT PROGRAM AT ROCHESTER

8:00–10:00. Surgical Clinics, St. Mary's Hospital.

8:00–10:30. Experimental and Clinical Laboratory Demonstrations, Mayo Clinic Building.

10:30–12:30. Joint Scientific Session Federated Societies, Assembly Room, Mayo Clinic Building.

Comparative measurements of new-born babies: Rood Taylor (by invitation), The Mayo Foundation.

Blood-cholesterol in malignancy and the effect of radium on blood-cholesterol: G. M. Luden (by invitation), The Mayo Foundation.

The normoblast crisis; its place, significance and duration in blood regeneration: Cecil K. Drinker, Katherine R. Drinker and Henry A. Kurtzman (by invitation), Harvard Medical School.

The rôle of afferent impulses in the control of respiratory movements: H. C. Combs (by invitation), and F. H. Pike, Columbia University.

Parallel determinations of amylase and dextrose-glycogen of the blood, liver and kidney after feeding: E. Eugene Brown (by invitation), and Chas. W. Greene, University of Missouri.

Note on psychic secretion from the sight and smell of food in man: Arno B. Luckhardt, University of Chicago.

Brain changes associated with pernicious anemia: H. W. Woltmann (by invitation), The Mayo Foundation.

Effects of cytolysins on the rabbit in relation to inheritance: M. F. Guyer, University of Wisconsin.

Bio-pathological standardization: W. C. MacCarty (by invitation), The Mayo Foundation.

A study of the comparative anatomy of the biliary tract and the Sphincter of Oddi with special reference to animals without a gallbladder: F. C. Mann, The Mayo Foundation.

Some further notes on the detoxification of potasium chloride in the guinea-pig: Samuel Amberg and P. E. Helmholtz (by invitation), Children's Memorial Hospital, Chicago.

Physiological function of the thyroid: H. S. Plummer (by invitation), The Mayo Foundation.

Development of certain types of malignant tumors of the thyroid: Louis B. Wilson (by invitation), The Mayo Foundation.

Blood regeneration after simple anemia. Curve of regeneration influenced by dietary factors: C. W. Hooper and G. H. Whipple (by invitation), Hooper Institute.

Blood regeneration after simple anemia. Curve of regeneration influenced by starvation, sugar, amino acids and other factors: G. H. Whipple and C. W. Hooper (by invitation), The Hooper Institute.

Fat embolism: W. W. Bissell (by invitation), The Mayo Foundation.

Lipemia (20 minutes): W. R. Bloor, Harvard University Medical School.

The action of light in injuring the eye: W. E. Burge, University of Illinois.

Changes in reflex thresholds following intestinal manipulation: Eugene L. Porter, University of Pennsylvania.

Lipase and fat variations in the blood as a result of muscular work: Dudley A. Robnett (by invitation), and Chas. W. Greene, University of Missouri.

Simultaneous measurements of the lipase and fat of the blood, liver and kidney during digestion and absorption: George G. Harvey (by invitation), and Chas. W. Greene.

Note in regard to the amount of sugar normally in blood of cats: E. L. Scott, Columbia University.

On the comparative absorption power for drugs of the bladder and urethra (male): David I. Macht, Johns Hopkins Medical School.

On the relation of the chemical structure of opium alkaloids to their action on smooth muscle structures: David I. Macht, Johns Hopkins.

Chas. W. Greene,
Secretary